

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	
Expanding the Economic and Innovation)	GN Docket No. 12-268
Opportunities of Spectrum Through Incentive)	
Auctions)	

**SUPPLEMENTAL COMMENTS OF COMPETITIVE CARRIERS ASSOCIATION
REGARDING THE 600 MHZ BAND PLAN**

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Competitive Carriers Association (“CCA”) hereby submits supplemental comments in response to the Public Notice issued by the Wireless Telecommunications Bureau seeking additional input and data on various band plans that have been proposed for the 600 MHz band.¹

INTRODUCTION AND SUMMARY

The broadcast incentive auction undoubtedly will be the most complex spectrum auction ever conducted. The Public Notice raises many important technical questions about various potential band plan configurations, including several variations on the “Down from 51” plan discussed in the Notice of Proposed Rulemaking.² CCA applauds the Commission’s willingness to consider and evaluate alternative approaches and its efforts to obtain additional input on the challenging decisions that must be made regarding the band plan.

¹ See *Wireless Telecommunications Bureau Seeks to Supplement the Record on the 600 MHz Band Plan*, Public Notice, GN Docket No. 12-268, DA 13-1157 (May 17, 2013) (“Public Notice”).

² See *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking, 27 FCC Rcd 12357 (2012) (“NPRM”).

Among the considerations raised in the Public Notice is whether the Commission should pursue some variation of an FDD band plan, or instead a TDD band plan.³ CCA at this time does not take a position on whether FDD or TDD is preferable; both approaches have merits, and CCA believes that the Commission at this stage should remain open to considering both options. However, there are several elements of the proposed band plans that are common to all plans and will apply regardless of which approach the Commission implements. Such common elements include multiple features that have broad support in the record, such as promoting interoperability across the entire 600 MHz band, establishing appropriately sized geographic markets, and clearing Channel 51, among others. The Commission should provide guidance on these common aspects of the band plans as soon as possible (and well in advance of the auction) to provide greater clarity and certainty, but also undertake a full and open examination of the more challenging technical and physical advantages and disadvantages of the various proposals. A rush to judgment merely for the sake of satisfying an arbitrary timeline would be shortsighted, and could lead to unforeseen problems down the road that might have been discovered but for a thorough analysis.

In addition, as discussed below, the Commission should clarify certain aspects of the proposed FDD and TDD band plans to provide predictability and to aid in the evaluation of the specific plans. CCA looks forward to working with the Commission to ensure that the incentive auction becomes a success, raises sufficient revenue to comply with all the requirements of the Spectrum Act and construct a much-needed nationwide public safety network,⁴ and boosts competition in the highly concentrated wireless industry.

³ See, e.g., Public Notice at 5-6.

⁴ See generally Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 126 Stat. 156 (2012).

DISCUSSION

I. THE COMMISSION SHOULD ADOPT CERTAIN PROPOSALS THAT WILL APPLY REGARDLESS OF WHICH BAND PLAN IS ADOPTED

The Public Notice principally discusses certain “Down from 51” proposals, including TDD and FDD variations on the version presented in the NPRM. However, there are several critical considerations that will apply regardless of which band plan the Commission adopts. The Commission can bring significant clarity and predictability to the process by addressing and resolving these issues promptly.

a) Importance of Licensed Spectrum

The Commission’s paramount objective in developing its band plan should be to maximize the amount of licensed spectrum that is made available to the wireless industry. The tremendous growth in demand for wireless voice and data services has resulted in a looming spectrum crunch, and the Commission should be focused on using this opportunity to allocate additional licensed spectrum for commercial mobile services.

To create a successful auction, the Commission should do everything in its power to maximize participation by broadcasters to repurpose spectrum for licensed wireless uses. The Commission can do so by providing clarity and transparency in its bidding rules so that broadcasters can accurately assess the benefits of participating. CCA supports the Commission’s efforts to reach out to broadcasters to educate and inform them about the opportunities presented by the incentive auction.⁵ CCA also supports Commissioner Rosenworcel’s proposal that the

⁵ See, e.g., Federal Communications Commission, Broadcaster LEARN Program Workshop (Oct. 26, 2012), *available at* <http://wireless.fcc.gov/learn/LEARN-Deck-12-5-12.pdf>; Federal Communications Commission, Incentive Auctions - LEARN - A Groundbreaking Event for the Broadcast Television, Mobile Wireless, and Technology Sectors of the U.S. Economy, *available at* <http://wireless.fcc.gov/incentiveauctions/learn-program/index.html> (last visited June 12, 2013); Federal Communications Commission,

Commission hold a series of hearings on various aspects of the incentive auction proceeding.⁶ NAB recently supported these hearings,⁷ and CCA agrees that they are a good idea. Along with these proposals, CCA has previously offered other suggestions on how broadcasters might be brought to the table.⁸ But the Commission should leave no stone unturned in its continued efforts to ensure broadcasters' enthusiasm and participation in the reverse auction, which, in combination with reasonable aggregation limits on the two dominant carriers will provide the low-band spectrum necessary to sustain long-term robust competition among wireless broadband providers.

Still, the greatest opportunities to promote participation likely will come from auction design. The specific structural elements that the Commission implements, such as the range of bidding options, reserve prices and the process for determining winning bids ultimately will determine whether the auction creates sufficient economic incentives for broadcasters to participate. The Commission should ensure that each choice that it makes regarding auction design has the goal of promoting broadcaster participation.

b) 5 and 10 MHz “Building Blocks”

There is agreement from virtually all carriers (including AT&T and Verizon) that the Commission should employ 5 MHz paired “building blocks” in FDD band plans and in the case

LEARN Workshop: 600 MHz Band Plan (May 3, 2013), *available at* <http://www.fcc.gov/events/learn-workshop-600-mhz-band-plan>.

⁶ Remarks of Commissioner Jessica Rosenworcel at CTIA 2013—The Mobile Marketplace, Las Vegas, Nevada at 2 (May 22, 2013), *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0523/DOC-321155A1.pdf

⁷ *Ex Parte* Letter from Jane E. Mago, Executive Vice President & General Counsel, National Association of Broadcasters, WT Docket No. 12-268 (filed May 29, 2013).

⁸ *See* Comments of Competitive Carriers Association, Docket No. 12-268 at 19 (filed Jan. 25, 2013); Reply Comments of Competitive Carriers Association, Docket No. 12-268 at 16-17 (filed Mar. 12, 2013).

of TDD, 10 MHz blocks. These block sizes will maximize the number of licensed blocks in an area and will enable wireless carriers to provide mobile broadband services. In addition, creating paired 5 MHz blocks and unpaired 10 MHz blocks comports with current industry practices and with the block sizes used in other bands.

c) Clearing Channel 51

There is near-universal agreement that the Commission should seize the opportunity to clear Channel 51 through the incentive auction process to facilitate deployment in the Lower 700 MHz A Block. Clearing Channel 51 will help level the playing field and support rural, mid-size, and regional carriers, because such carriers own many of the Lower 700 MHz A Block licenses. System deployment within the Lower A Block has been delayed by the presence of Channel 51 broadcast transmissions in many markets. The broadcast transmissions pose an interference risk to Lower A Block base station reception in the adjacent block, and current FCC rules require A Block deployments to protect the service contours around Channel 51 stations. As CCA has consistently recommended, the Commission should promptly clarify that Channel 51 will be the first channel cleared in any market, whether it is used for wireless services in the “Down from 51” plan proposed in the NPRM, or used as a guard band in alternative FDD or TDD proposals. The Commission also should incentivize the clearing of Channel 51 by reducing the exclusion zones that would be enjoyed by Channel 51 operators if they choose to remain in their current location. Finally, the Commission should promote the immediate, voluntary relocation of Channel 51 broadcasters by clarifying that broadcasters who voluntarily vacate Channel 51 forthwith nevertheless will be able to recover auction revenues. The Commission should not entertain any band plan that would not guarantee, *ex ante*, the clearing of Channel 51.

d) Interoperability

In addition, it will be critical for the Commission to ensure interoperability across the 600 MHz band, regardless of what band plan it adopts. The Commission rightly has focused on interoperability as one of the critical goals of the auction.⁹ The Commission should affirm that interoperability across the entire band will be required regardless of band plan.

The absence of an interoperability requirement would allow the two largest carriers to develop wireless equipment which would support only their licensed blocks. With the ecosystem purchasing power focused within a portion of the band, competitive carriers would experience years of delay in gaining initial access to devices, and thereafter perpetually lack the breadth of device options available to the largest operators.

Competitive carriers with 700 MHz Lower A Block licenses experienced this exact situation after the close of Auction 73 in 2008. The Lower A Block is adjacent to two similarly paired blocks, the Lower B and C Blocks. Prior to and during the auction, standards work within the Third Generation Partnership Project (3GPP) grouped the Lower A Block within the same band class as the Lower B and C Blocks, 3GPP Band Class 12. Competitive carriers bidding in Auction 73 had the reasonable expectation that devices would be available in a timely manner to support their deployment plans.

Instead, AT&T, the largest holder of Lower B and C Block licenses, purchased equipment supporting a subset of the auctioned Lower 700 MHz blocks, fragmenting the ecosystem and greatly delaying Band 12 equipment support. The Commission must require interoperability for all auctioned blocks in the incentive auction to ensure access to a wide range of devices for competitive carriers.

⁹ See NPRM ¶ 25.

In addition to an interoperability requirement, there are a variety of steps that the Commission can take to further ensure interoperability. In an FDD scenario, the Commission can solicit bids for generic, interchangeable building blocks that make it difficult for AT&T or Verizon to cordon off a smaller range of frequencies that they alone control. In addition, if the Commission considers using multiple duplexers, it should require devices to be capable of operating using all duplexers, to avoid the similar problem of the largest carriers' creating separate rules and separate devices that use only one duplexer. And if the Commission adopts a TDD band plan, it should require devices to be capable of operating across all TDD blocks. The Commission should ensure that interoperability becomes a reality under any scenario.

e) Appropriately Sized Geographic Markets

The Commission should use sufficiently small geographic areas so rural, mid-sized, and regional carriers retain incentives to participate, while allowing larger carriers to aggregate blocks to serve larger geographic areas. Specifically, the FCC should license the incentive auction spectrum in Cellular Market Areas (CMAs) to encourage the broadest participation possible among all sized-carriers, generate the maximum amount of revenue from the auction, and create a competitive framework that allows all carriers an opportunity to acquire spectrum to improve the competitive nature of the mobile market.¹⁰

¹⁰ Use of CMAs is merely one tool the FCC can and should use to encourage competition in the auction and in the market. The FCC must deploy other tools like spectrum aggregation limits to prevent the two dominant carriers from further solidifying their disproportionate control of below 1 GHz spectrum. As CCA described in recent testimony before the Subcommittee on Communications, Technology and the Internet of the Senate Commerce Committee, the Commission must adopt auction rules that prevent the operators with the vast majority of low-frequency spectrum from extending their concentration within the 600 MHz band. *See* Testimony of Steven K. Berry, President and CEO, Competitive Carriers Association, "The State of Wireless Communications," U.S. Senate Committee on Commerce, Science and Transportation, Subcommittee on Communications, Technology and the Internet at 7-8 (June 4, 2013), *available at*

To increase participation among all carriers, but in particular smaller, rural carriers, the FCC should use CMAs when auctioning the 600 MHz band. If not, smaller carriers that often aggressively participate in spectrum auctions when they have a meaningful opportunity to win spectrum will not show-up. For example, Bluegrass Cellular (Bluegrass) has been providing service to rural parts of Kentucky since 1990. Bluegrass holds 700 MHz spectrum in five CMAs, with population centers rarely above 50,000 people. Those markets include CMAs 209 (Clarksville-Hopkinsville, TN-KY), 293 (Owensboro, KY), 444 (Kentucky 2 – Union), 447 (Kentucky 5 – Barren) and 448 (Kentucky 6 – Madison). If the FCC uses Economic Areas (EAs), for example, to license the 600 MHz spectrum, Bluegrass would be forced to bid on four EAs—47, 69, 71 and 72—which include much more populated areas such as Lexington and Richmond Kentucky; Nashville, Tennessee and Evansville, Indiana, just to win spectrum to cover the counties within its current service footprint.¹¹ In this example, Bluegrass would have to bid on spectrum that covers approximately six million pops when its core markets cover a much smaller footprint (somewhere closer to 1.2 million pops). Bluegrass is not alone. Most of CCA’s smaller members are similarly situated. Bluegrass does not have the financial wherewithal to bid on four or five separate EAs encompassing five times the number of pops it

http://www.commerce.senate.gov/public/?a=Files.Serve&File_id=d9bd6e3c-75c4-4323-afc4-9aa933160118.

¹¹ This assumes the Commission uses EAs as they existed in 1995. Should the Commission adopt updated EA configurations from 2004, Bluegrass would actually be forced to bid on *five* EAs to cover its current service footprint: 54 (Evansville-Henderson), 94 (Lexington-Fayette-Frankfort-Richmond), 98 (Louisville-Elizabethtown-Scottsburg), 116 (Nashville-Davidson-Murfreesboro-Columbia), and 122 (Paducah). *Compare* Economic Areas delineated by the Regional Economic Analysis Division, Bureau of Economic Analysis, U.S. Department of Commerce February 1995 and extended by the Federal Communications Commission, 62 FR 9636 (Mar. 3, 1997), *with* U.S. Dept. of Commerce, Bureau of Economic Analysis, BEA Economic Areas, *available at* <http://www.bea.gov/regional/docs/econlist.cfm>.

currently serves. If the Commission adopts EAs, Bluegrass and similarly sized carriers will almost certainly be foreclosed from participating in the auction.

In Auction 73, nearly 100 smaller or rural carriers participated in the auction, predominantly bidding on CMAs. In addition to the almost \$2 billion competitive carriers paid for licenses in Auction 73, these small entities also bid \$1.2 billion for licenses that larger providers ultimately paid \$1.6 billion to win—driving an additional \$400 million in revenue that most likely wouldn't have materialized had these carriers not participated and increased bid amounts. Most of these carriers will not participate in the 600 MHz spectrum auction if the FCC does not license the spectrum in small geographic markets, like CMAs, significantly reducing participation in and revenues for the auction. By contrast, using large geographic areas would give significant and unwarranted advantages to the largest nationwide carriers at the expense of smaller carriers, and would risk leaving behind rural America.

In addition to increased participation, use of CMAs also will increase the revenues generated from the incentive auction. Indeed, looking back at the 700 MHz auction, blocks of spectrum made available in smaller geographic areas generated more revenue on a MHz-pop basis than larger geographic areas. The Upper C Block, auctioned in 12 Regional Economic Area Groups, sold for only \$0.76/MHz-pop. The Lower A Block, auctioned in smaller areas through 176 EAs, sold for \$1.16/MHz-pop. And the Lower B Block, auctioned in even smaller areas, 734 CMAs, sold for \$2.68/MHz-pop. With smaller geographic areas, more carriers are able to bid for licenses, and the increased number of bidders leads to higher revenue. Use of large geographic areas risk significantly reducing the number of potential bidders for licenses, thereby reducing potential auction revenue (as was the case in the Upper 700 MHz C Block).

CMAs strike the right balance and would be an effective geographic unit that would give rural and regional carriers reasonable opportunities to bid, increase the competition in the auction room, thereby increasing auction revenue, and assist in providing competitive opportunities for all carriers, especially smaller carriers, to acquire much-needed low-band spectrum.

f) Importance of Uplink Capability

Although much discussion in the record has focused on whether and to what extent the Commission should allocate available spectrum for supplemental downlink, CCA urges the Commission not to lose sight of the importance of uplink capabilities. In particular, competitive carriers in many instances are looking not only to supplement their spectrum assets in their existing footprints, but also to expand into additional areas.

Spectrum below 1 GHz has been widely acclaimed as “beachfront property” because radio frequencies in this range travel farther than in higher bands. An operator expanding wireless coverage with low-band spectrum for example will only require half of the number of sites as at higher bands, significantly reducing the initial capital expenditures and ongoing operational expenses. Wireless carriers may also overlay low-band spectrum on the existing grid of high-frequency band sites, greatly improving building penetration within their coverage footprint. Wireless system coverage is limited, however, by the low device transmission power. The coverage advantage of low-band spectrum may only be realized if the uplink, or device transmission, is placed within the low-frequency band.

Competitive carriers have limited access to low-frequency band spectrum today. AT&T and Verizon already control a combined 84% of the MHz-POPs of low-frequency spectrum.¹²

¹² See *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to*

The Incentive Auction provides a fresh opportunity to stimulate competition and pull the market back from the precipice of duopoly by delivering additional low-frequency band spectrum to the marketplace – provided of course that the Commission adopts an auction structure that allows carriers outside of AT&T and Verizon to acquire this critical input. To take full advantage of this valuable beachfront spectrum, a significant portion of the auctioned spectrum in each market must provide an uplink capability.

Uplink capability, whether under an FDD or TDD band plan, is critical to facilitating such expansion. As discussed below, certain FDD proposals may have the unintended consequence of reducing the availability of uplink capacity to competitive carriers, and the Commission accordingly should pay close attention to ensuring that additional low-band uplink capability is made available to the marketplace to help restore competition.

A TDD approach avoids the task of prioritizing uplink versus downlink spectrum, but instead allocates a contiguous block for both. TDD band plans inherently provide for uplink capability since a portion of the radio frame time is allocated for uplink communications. TDD also provides flexibility in opening new markets with relatively few DTV channels cleared, since a dedicated FDD duplex gap is not required. If the Commission expects that major markets may not have a large number of DTV channels cleared, then a TDD band plan may provide an opportunity for competitive carriers to gain access to low-band uplink capability.¹³

Mobile Wireless, Including Commercial Mobile Services, WT Docket No. 11-186, Sixteenth Report, FCC 13-34 at ¶ 2 (rel. Mar. 21, 2013).

¹³ See Wireless Strategy, Incentive Auction Band Plans and PN DA 13-1157 at 11-13, 19-20 (June 14, 2013). CCA attaches this engineering analysis as **Exhibit A** to these comments, in order to make it a part of the record in this proceeding.

g) Minimum Nationwide Threshold for Adoption of a Band Plan

The Commission also should clarify the minimum conditions under which it will adopt a national band plan. Realistically, there are likely to be certain targeted geographic areas, particularly near borders, that present unique challenges. The Commission should focus on adopting a principal band plan that works for most of the country, and should not allow challenges in outlying areas to scuttle any band plan that otherwise proves to be the best for most Americans.

The nationwide threshold will require a minimum number of DTV channels cleared in each market as a starting condition to open the market for auction. The minimum DTV clearance is a function of the adopted band plan and the corresponding assumptions about the device filtering employed. Markets with less than the minimum DTV clearance would not be opened for auction. As noted above, all markets should clear Channel 51 regardless of whether the nationwide minimum threshold has been met in the market.

The Commission can promote certainty and predictability by establishing the threshold at which it will deem a band plan to be sufficiently beneficial to constitute the default national band plan (for example by determining the minimum number of covered POPs that a national band plan would serve), while continuing to work on resolving any unique challenges in particular local areas.

h) Appropriately Sized Guard Bands

Congress mandated that guard bands be “no larger than technically reasonable,” and the Commission accordingly should limit the size of guard bands to only as many megahertz as are

required to prevent harmful interference.¹⁴ Such appropriately sized guard bands could be as small as 3 MHz, and in no event should be larger than 6 MHz.

The sufficiency of 6 MHz to protect base station reception is well established by the success of 700 MHz Lower B and C Block operations in markets with incumbent Channel 51 operations. The frequency separation from the Lower B Block to the edge of Channel 51 is 6 MHz.

Similarly, a 6 MHz frequency separation is sufficient to protect device reception. The 3GPP technical specifications for Band 12 and 17 devices require an in-band blocking specification of -30 dBm at a 6 MHz offset.¹⁵ In reply comments, Ericsson cited a Nokia television measurement campaign which determined that “received TV signal strengths of up to -30 dBm (averaged) from 50 kW ERP DTV and 600 kW ERP analog TV transmissions are reported.”¹⁶ Laboratory measurements of commercial Lower 700 MHz LTE devices demonstrated receiver blocking performance vastly superior to the 3GPP specification, more than accounting for any differences in ERP or configuration among broadcast stations.¹⁷ Device reception would be well-protected with a 6 MHz guard band from remaining high-power DTV operations.

¹⁴ NPRM ¶¶ 156, 158.

¹⁵ 3GPP TS 36.101 v11.2.0 “E-UTRA User Equipment radio transmission and reception”, release 11, Table 7.6.1.1-2: In-band blocking.

¹⁶ Reply Comments of Ericsson Inc., Docket No. 12-268 at 43 (filed Mar. 12, 2013).

¹⁷ See D. Hyslop and P. Kolodzy, *Lower 700 MHz Test Report: Laboratory and Field Testing of LTE Performance near Lower E Block and Channel 51 Broadcast Stations* (April 11, 2012); Reply Comments of V-Comm, L.L.C., Prepared on behalf of Cavalier Wireless, Continuum 700, King Street Wireless, MetroPCS Communications, Inc., Vulcan Wireless LLC, WT Docket No. 12-69 (July 13, 2012). CCA attaches those studies as **Exhibit B** and **Exhibit C**, respectively to these comments, in order to make those studies part of the record in this proceeding.

Keeping the guard bands to the smallest size necessary to prevent harmful interference will maximize the amount of spectrum available for auction and will lead to increased auction revenues.

i) Impact of Band Plan at Each Increment of Cleared Spectrum

The major alternative band plan proposals have taken the form of one or two default scenarios that presume particular levels of cleared spectrum, along with some leeway for minor variations by market. But in reality, any band plan will create a “staircase effect,” in which rules that apply based on a given level of cleared spectrum will have ramifications for what can occur if more or less spectrum is cleared, including spectrum that may be cleared years down the road. For example, if a default plan assumes the clearing of 12 DTV channels, the Commission also must consider what would occur at the next relevant increment—say, 15 channels—and assess how the rules that apply for 12 channels would affect what can be done with 15.¹⁸ The Commission therefore should not simply consider a default scenario for a given band plan and assume that it can implement adjustments to account for spectrum variations. Rather, the Commission should evaluate comprehensively what will occur at each increment of spectrum, including what will occur if remaining DTV stations ultimately are cleared years in the future.

II. THE COMMISSION SHOULD CLARIFY CERTAIN FEATURES OF POTENTIAL FDD AND TDD PLANS TO PROMOTE CERTAINTY AND PREDICTABILITY

CCA continues to analyze the various band plan proposals and does not at this time endorse a specific plan. But CCA has identified certain features of proposed FDD and TDD plans that the Commission should adopt to promote the public interest and increase the certainty and predictability of the auction.

¹⁸ Such “staircase effect” approach is also useful in addressing market variability in an orderly fashion. *See* Section I(g), *supra*.

a) The Commission Should Evaluate Potential FDD Plans with the Goal of Promoting Increased Competition

In its consideration of various FDD plans, whether “Down from 51” or “Down from 51 Reversed,” the Commission should be attentive to ensuring that sufficient spectrum is made available to competitive carriers, and should avoid scenarios in which one or two carriers have an opportunity to control the lion’s share of spectrum.

As an initial matter, the Commission should seek to maximize the amount of paired spectrum. Paired spectrum can be used not only to supplement services in existing footprints, but also to expand into new areas. Accordingly, paired spectrum has particular value to the competitive community, and the Commission can take an important step in reducing the high concentration in the wireless industry by promoting the availability of paired spectrum.

In addition, if the Commission allocates excess unpaired spectrum for supplemental downlink, it should not implement any supplemental downlink allocations above Channel 37. Doing so would limit the amount of paired spectrum above Channel 37 initially, and forestall the future creation of paired spectrum. In the “Down from 51” FDD band plans, the channels above 37 would be ideally auctioned as paired spectrum blocks. Auctioning one-half of a pair as supplemental downlink in the current auction would strand the uplink of the pair. At a future time when additional DTV channels are cleared, the uplink would only be suited for sale as unpaired uplink spectrum with little value except to the existing holder of the unpaired downlink, which is likely to be one of the largest carriers.

As an illustrative example, in a “Down from 51” scenario involving both uplink and downlink above Channel 37 in which fewer than 14 channels are cleared, DTV stations might be placed in the uplink band to reduce the minimum starting position in a spectrum-constrained market. That would generate an unpaired supplemental downlink band above Channel 37. But

if the DTV stations subsequently were cleared, the Commission would be forced to auction the newly freed spectrum as unpaired uplink. The entity that would most value this spectrum would be the owner of the corresponding supplemental downlink blocks. Such an approach would not necessarily present the most efficient allocation of spectrum, and it could threaten competitive carriers' access to paired uplink blocks that could be used for expansion over the long term.

b) Intermodulation Concerns Raised by Commenters Have No Engineering or Technical Basis

The Public Notice also squarely recognizes the concerns that have been raised about high power DTV stations' continuing to operate in the duplex gap, suggesting that intermodulation may cause interference.¹⁹ In CCA's view, such intermodulation concerns are unfounded. Any intermodulation caused by a DTV channel located close to the uplink band will not fall within the device receive band, but rather in the intervening DTV channels. By contrast, DTV operations further away from the uplink band theoretically could generate intermodulation, but in practice such intermodulation would be significantly attenuated by the duplexer filter. The filter attenuation in such a scenario is more than adequate to reduce the DTV power to manageable levels.

Significantly, the concerns about potential interference arising from intermodulation are not meaningfully different from intermodulation concerns with respect to the Lower 700 MHz bands. Two recent studies filed in the 700 MHz interoperability proceeding confirm that intermodulation interference is a red herring, even for Band 12 devices with no significant

¹⁹ See Public Notice at 2.

filtering of the DTV signal.²⁰ Those studies confirm that intermodulation arising from DTV operations in the duplex gap is not a legitimate threat to LTE deployment.

c) The Commission Should Define Certain Technical Parameters of Proposed TDD Deployment to Allow For Better Evaluation of TDD Band Plans

Finally, the Commission can provide some needed clarity and guidance regarding proposed TDD band plans by defining certain key parameters that would apply to such a plan. Specifically, if the Commission determines that operators are unlikely to reasonably agree on 3GPP-specified asymmetry ratios in a timely manner, the Commission should consider defining the default TDD asymmetry ratio that would apply to TDD deployment – or offer a series of default rules (for instance, a subset of default asymmetry ratios considered reasonable) to act as a regulatory backstop. In TDD systems, adjacent channel operations must employ the same timing of base station transmit and device transmit to avoid inter-system interference. Providing guidance of this timing split, or asymmetry ratio, at the time of auction would speed time to market by resolving the inevitable negotiation process among licensees to reach a common standard. The Commission should explain whether it envisions 50/50 symmetry, or some measure of asymmetry that presumably provides for increased downlink relative to uplink.²¹ The Commission also should explain whether and how the asymmetry ratio might vary over time, as usage patterns evolve. Finally, the Commission should define the radio frame timing approach that it intends to use to manage inter-system interference. Not only must the asymmetry ratio be

²⁰ See D. Hyslop and P. Kolodzy, *Lower 700 MHz Test Report: Laboratory and Field Testing of LTE Performance near Lower E Block and Channel 51 Broadcast Stations*, WT Docket No. 12-69 (Apr. 11, 2012); Reply Comments of V-Comm, L.L.C., Prepared on behalf of Cavalier Wireless, Continuum 700, King Street Wireless, MetroPCS Communications, Inc., Vulcan Wireless LLC, WT Docket No. 12-69 (July 13, 2012) (attached hereto as **Ex. B** and **Ex. C**, respectively).

²¹ CCA notes that existing TDD systems in the 2.5 GHz band employ a 60/40% downlink/uplink ratio.

defined to ensure a common radio frame across licensees, but the start time of the radio frame must also be synchronized to maintain harmonized transmissions. Clarity with respect to these aspects of a proposed TDD plan would enable carriers to better evaluate the proposals in the record and would provide increased predictability to the auction process.

CONCLUSION

CCA applauds the Bureau's efforts to supplement the record and solicit additional input on these complex issues. CCA and its members remain motivated to work with the Bureau and the Commission to make the incentive auction a success for the competitiveness of the industry and for the benefit of consumers.

Respectfully submitted,

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